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B.E. /B.Tech. (Full Time)DEGREE END SEMESTER EXAMINATION, NOV/DEC 2011

Manufacturing Engineering Branch

SEVENTH SEMESTER- (REGULATION 2008)

ME 9301 - DESIGN OF JIGS, FIXURES AND PRESS TOOLS

Time: 3 hr Max. Marks: 100

Instructions: i) Use of Approved Design Data Books permitted
ii) Drawing sheets will be provided
iii) Drawings need not be drawn to scale but should follow standards.
iv) Assume missing dimensions suitably

Answer ALL Questions

PART - A (10x 2= 20 Mark)

1. Describe with the aid of suitable sketches what is meant by 3-2-1 Location Principle with respect to design of Jigs and fixtures.
2. What is meant by "Foolproofing"?
3. What are the advantages of Box jigs?
4. What are the different types of drill bushes? When is each type used?
5. What is the function of a tenon? How is it used in a fixture?
6. 'V' blocks are widely used in milling fixtures. State the reasons.
7. What are modular fixtures? Give typical uses for the same.
8. What is meant by lancing? How is it different from blanking?
9. How will you compute the diameter of Blank required for drawing a straight sided cylindrical cup of diameter 'd' and height 'h'?
10. What is the function of a die ring/insert?

PART - B (5 x16 = 80 Mark)

11 .Design a Turning Fixture for use when finish boring the ϕ50 bore in the shaft support shown in Figure.
i) Give a neat operation chart. 16
ii) Draw two views of the fixture.
iii) Specify appropriate fits and tolerances for critical parts.
iv) Dimension the views.
v) Give a neat parts list.

12.a Explain with the help of neat sketches the 3-2-1 Location Principle. 16
What are the basic principles of clamping? Draw and explain the working of an equalizer clamp and a strap clamp.

Or

12.b Design a drilling jig for use when drilling the ϕ30 holes in the component shown in Figure. Assume that the base has been machined. 16

i) Draw two views of the Jig.
ii) Specify appropriate fits and tolerances for critical parts.
iii) Dimension the views.
iv) Give a neat parts list

13.a Design a Drill Jig for drilling the holes of ϕ 10 in the component shown in Figure, 16

i) Give a neat operation chart.
ii) Draw two views of the jig.
iv) Dimension the views.
v) Give a neat parts list.

Or

13.b Design a Milling fixture for milling the faces marked ▽M in the component shown in Figure 16

i) Draw two views of the fixture.
ii) Specify appropriate fits and tolerances for critical parts
iii) Dimension the views.
iv) Give a neat parts list.

14.a Design and draw 2 views of a combination Blanking and drawing die for the component shown in Figure. Assume yield strength 45kN/cm^2 16

Calculate the size of Blank required
Determine the press tonnage and the various stations required
Design all the parts of the die.
Draw two fully dimensioned views of the die in engaged position.
Give a parts list.

Or

14.b Design and draw two views of a progressive die for producing the component shown in Figure. The sheet metal is of 2.5 mm thickness and width equal to the width of the component. The sheet is made of Cold Rolled Steel of Ultimate tensile Strength 650 N/mm^2. The sequence of operations is piercing parting and edge bending. 16

i) Determine the press tonnage and the various stations required
ii) Design all the parts of the die.
iii) Draw two fully dimensioned views of the die in engaged position.
iv) Give a parts list.

15.a Write short notes on the following:

i) Center of Pressure 4
ii) Direct and indirect knockouts 8
iii) Metal flow in drawing operations. 4

Or

15.b Write short notes on the following:

i) Press tonnage for V, Edge and Channel Bending 8
ii) Shut height of a press and shut height of a die. 4
iii) Redraw dies in deep drawing 4